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"A series of observations has been made for ascertaining any deviation from circularity in the form of the pivots of the vertical circle, but no sensible fault was found. * * *

"*Magnetical and Meteorological Observations.*—No change is made in the system of observations; photographic self-registration being applied to the principal magnetical and meteorological instruments, pencil self-registration being applied to the wind and rain, and eye-observations being intermingled for zeros. Commencing with 1856, August 25, the thermometers in the magnet-boxes have been read at twenty-four consecutive hours once in every week, with the view of obtaining bases for complete reduction of the observations. The regular observations of the maximum and minimum thermometers in the Thames have been interrupted, as has been stated above, but I hope that arrangements may be made for their restoration. * * *

"Mr. Main's examination of Bessel's Refraction Tables, to which allusion was made in the last Report, is completed; it shows that the correction required, though small, is distinct. The temperature coefficient can scarcely be improved.

"The account (by myself) of the construction of the national standards of length is completed.* Some supplementary works relating to the equipment of the Exchequer Office still require attention.

"The British Government had for some years past contributed by pecuniary grants to the preparation of Professor Hansen's Lunar Tables. In the last winter they undertook the entire expense of printing a large impression of the Tables. The reading of the proof-sheets (a very considerable labour) has been effected entirely at the Observatory. I may take this opportunity of stating that the use of these Tables has enabled me, as I think, incontestably to fix the capture of Larissa to the date B.C. 556, May 19. This identification promises to prove valuable, not merely for its chronological utility, but also for its accurate determination of an astronomical epoch, the point eclipsed being exactly known, and the shadow having been very small. Several calculations have been made in reference to this and the two other ancient eclipses (of Agathocles and Thales), which I am now preparing to combine in one system of calculation."

## *Formulæ of Navigation and Nautical Astronomy.* Arranged by Capt. Charles F. A. Shadwell, R.N., C.B. London, 1856.

These formulæ are exhibited on a series of twelve cards, enclosed in a pocket-case. Each formula is accompanied by an explanatory statement which is in most cases illustrated by means of a simple diagram. The selection of formulæ includes all those which are required for the solution of the working problems of

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* A paper on this subject by the Astronomer Royal has been recently communicated to the Royal Society.—R. G.

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navigation. To those who prefer the use of algebraic expressions to the diffuse language of a verbal precept, this publication will, no doubt, prove very serviceable; while others may be stimulated by it to extend their acquaintance with the processes of mathematical science, which would give them a mastery over the formulæ otherwise unattainable.

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Dr. Rudolph Wolf, of Berne, in a letter to the Editor of the *Astronomische Nachrichten*, mentions that he has prepared for the press a paper on the Solar Spots, which will shortly appear in a Zurich periodical. This paper will contain a catalogue of 1131 observations of the solar spots by Staudacher of Nürembürg, extending over the period included between the years 1749 and 1799. From an examination of this catalogue, Dr. Wolf obtained the following results exhibiting the relative numbers of spots for each of the various years to which the observations refer.

| Year. | Rel. Number of Spots. | Year. | Rel. Number of Spots. | Year. | Rel. Number of Spots. |
|---|---|---|---|---|---|
| 1749 | 31·9 | 1766 | 16·1 | 1783 | 10·9 |
| 50 | 34·6 Max. | 67 | 16·6 | 84 | 2·2 Min. |
| 51 | 19·4 | 68 | 26·1 | 85 | 8·9 |
| 52 | 16·4 | 69 | 42·5 Max. | 86 | 30·4 |
| 53 | 11·3 | 70 | 39·7 | 87 | 46·4 Max. |
| 54 | 2·2 | 71 | 36·6 | 88 | 45·3 |
| 55 | 0·0 Min. | 72 | 24·6 | 89 | 39·4 |
| 56 | 6·4 | 73 | 16·0 | 90 | 37·6 |
| 57 | 8·2 | 74 | 11·0 | 91 | 22·8 |
| 58 | 22·2 | 75 | 5·8 | 92 | 21·7 |
| 59 | 24·0 | 76 | 0·0 Min. | 93 | 17·0 |
| 60 | 25·1 | 77 | 39·3 | 94 | 0·0 |
| 61 | 37·5 Max. | 78 | 49·9 } Max. | 95 | 2·0 |
| 62 | 25·3 | 79 | 49·6 } | 96 | 12·0 |
| 63 | 18·7 | 80 | 36·3 | 97 | 0·0 |
| 64 | 19·1 | 81 | 35·2 | 98 | 0·0 |
| 65 | 11·5 Min. | 82 | 14·3 | 99 | 0·0 Min. |

Dr. Wolf states that the same publication will contain a series of very careful observations of the solar spots, by Zucconi, for the years 1754–57, from which he has deduced the following relative numbers:—

| Year. | Rel. Number of Spots. |
|---|---|
| 1754 | 9·9 |
| 55 | 5·2 |
| 56 | 6·7 |
| 57 | 19·7 |

Both series of observations, Dr. Wolf adds, corroborate the

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